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Introducing the transparency and openness promotion (TOP) guidelines and badges for open practices at *Cortex*

Christopher D. Chambers

Cardiff University Brain Research Imaging Centre (CUBRIC), School of Psychology, Cardiff University, United Kingdom

Email: chambersc1@cardiff.ac.uk

It is now recognised that improving the reproducibility of the life and social sciences will require a coordinated effort by journals, funders, institutions, and researchers to make the research process as open and transparent as possible (Munafò et al., 2017). Over the last five years, *Cortex* has been at the forefront of these reforms, being the first journal to offer Registered Reports (Chambers, 2013), and also the first to adopt the complementary format of Exploratory Reports (McIntosh, 2017). We are now excited to be launching two additional initiatives to increase transparency for readers and to reward transparency by authors: the Transparency and Openness Promotion (TOP) Guidelines and Badges for Open Practices.

The TOP Guidelines, established in 2015, are a certification scheme in which journals and research organisations declare their level of adherence to a series of modular standards for enabling research transparency and reproducibility (Nosek et al., 2015; see Table 1). Since launching, the initiative has attracted 5000 signatories and is now entering the implementation phase in which the journals and organisations that originally supported the scheme put their level of adherence into practice. *Cortex* was one of the first TOP signatories and is now adopting a minimum of Level 2 (of three possible levels) across the eight TOP standards, including citation practices (#1), availability of data (#2), analysis code (#3) and digital research materials (#4), design and analysis transparency (#5), preregistration of study procedures (#6) and analysis plans (#7), and replication (#8).

Table 1. The TOP Guidelines describe increasing levels of adherence to eight modular transparency standards, covering citations, availability of data, code, materials and design, preregistration of study procedures and analysis plans, and replication. The levels adopted by *Cortex* for each standard are highlighted in bold. For further details on our TOP policy, see the detailed Guide to Authors [https://www.elsevier.com/_data/promis_misc/Cortex-TOP-author-guidelines.pdf].

	Not Implemented	Level 1	Level 2	Level 3
Citation Standards	Journal encourages citation of data, code, and materials, or says nothing.	Journal describes citation of data in guidelines to authors with clear rules and examples.	Article provides appropriate citation for data and materials used consistent with journal's author guidelines.	Article is not published until providing appropriate citation for data and materials following journal's author guidelines.
Data Transparency	Journal encourages data sharing, or says nothing.	Article states whether data are available, and, if so, where to access them.	Data must be posted to a trusted repository. Exceptions must be identified at article submission.	Data must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Analytic Methods (Code) Transparency	Journal encourages code sharing, or says nothing.	Article states whether code is available, and, if so, where to access it.	Code must be posted to a trusted repository. Exceptions must be identified at article submission.	Code must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Research Materials Transparency	Journal encourages materials sharing, or says nothing.	Article states whether materials are available, and, if so, where to access them.	Materials must be posted to a trusted repository. Exceptions must be identified at article submission.	Materials must be posted to a trusted repository, and reported analyses will be reproduced independently prior to publication.
Design and Analysis Transparency	Journal encourages design and analysis transparency, or says nothing.	Journal articulates design transparency standards.	Journal requires adherence to design transparency standards for review and publication.	Journal requires and enforces adherence to design transparency standards for review and publication.
Study Preregistration	Journal says nothing.	Article states whether preregistration of study exists, and, if so, where to access it.	Article states whether preregistration of study exists, and, if so, allows journal access during peer review for verification.	Journal requires preregistration of studies and provides link and badge in article to meeting requirements.
Analysis Plan Preregistration	Journal says nothing.	Article states whether preregistration of study exists, and, if so, where to access it.	Article states whether preregistration with analysis plan exists, and, if so, allows journal access during peer review for verification.	Journal requires preregistration of studies with analysis plans and provides link and badge in article to meeting requirements.
Replication	Journal discourages submission of replication studies, or says nothing.	Journal encourages submission of replication studies.	Journal encourages submission of replication studies and conducts results blind review.	Journal uses Registered Reports as a submission option for replication studies with peer review prior to observing the study outcomes.

What does TOP implementation mean in practice for *Cortex* authors? There are some modest new submission requirements for authors of Letters, Notes, Exploratory Reports, and Research Reports (including regular submissions, Clinical Neuroanatomy submissions, and Behavioural Neurology submissions). First, in addition to existing bibliographic conventions, to ensure that citations recognise the increasingly diverse range of intellectual contributions to research, all publicly available data sets and program code must be appropriately cited in the text and listed in the reference section (#1, Level 3).

Second, authors are required to either archive their anonymised data, analysis code (e.g., R scripts, SPSS syntax, etc.) and digital study materials (e.g., stimuli, presentation code, etc.) in a freely accessible public repository or must provide an explanation in the manuscript for why archiving is not legally or ethically possible, together with specific guidance for how readers can gain access to data, code and materials on request (#2, #3, #4, all Level 2). Readers will note that this requirement aligns *Cortex* policy with the Peer Reviewers' Openness (PRO) Initiative ([Morey et al., 2016](#); <https://opennessinitiative.org/>).

Third, based on the proposal by [Simmons, Nelson, and Simonsohn \(2012\)](#), authors are now required to state the following in their manuscripts, elaborated as necessary: “*We report how we determined our sample size, all data exclusions (if any), all data inclusion/exclusion criteria, whether inclusion/exclusion criteria were established prior to data analysis, all manipulations, and all measures in the study*” (#5, Level 2).

Finally, authors are required to state in the manuscript whether any part of their study procedures or analysis plan was preregistered in an institutional registry prior to the research commencing, and, if so, provide a URL to the public preregistration. Where no preregistration took place, a simple statement to that effect must be made in the manuscript, with no further explanation needed (#6 and #7, Level 2). The last standard, replication (#8, Level 3), is already met at *Cortex* through our adoption of Registered Reports as an article option.

To make these requirements as clear and straightforward as possible, we will ask authors to complete a brief submission checklist indicating compliance with each applicable standard and indicating the page number in the manuscript where any necessary information is provided. To minimise this additional bureaucracy for authors, the checklist will be required only at the point of submitting a *revised* manuscript after in-depth review.¹ We have also reduced other, less essential administrative burdens for all submissions. We now offer the Your Paper Your Way scheme in which authors are welcome to submit a single integrated PDF for first submissions, including figures and tables placed in-text rather than at the end of the manuscript, and with references formatted in any consistent style. We have also made Highlights optional rather than mandatory.

The TOP guidelines improve clarity for readers but we also recognise the importance of highlighting authors who walk-the-walk in making their data, materials and study protocols openly available. This is why we are joining journals such as *Psychological Science*, *Journal of Experimental Social Psychology*, and *Journal of Research in Personality* in launching the Badges for Open Practices initiative, which is associated with greater uptake of open data, open materials and preregistration ([Kidwell et al., 2016](#)). Articles that meet sufficient standards for public archiving of data and materials will receive *Open Data* and *Open Materials* badges near the published title, while those involving preregistrations of study hypotheses, procedures, and/or analysis plans will receive the *Preregistered* or *Preregistered + Analysis Plan* badges. Authors who are unable to make their data publicly available due to ethical restrictions will be eligible for an *Open Data - Protected Access* badge if they deposit the data in an approved third party repository that manages access to qualified researchers through a documented process. Badges will be awarded at the judgment of the editors according to the criteria set by the Open Science Framework.² All empirical submissions will automatically be considered for possible badges – authors need not request that their article is considered.

We are confident that the implementation of the TOP Guidelines and Badges for Open Practices will significantly enhance the value and visibility of research published at *Cortex*, while also recognising the achievements of researchers in embracing transparency. Our implementation of these initiatives will be regularly reviewed and we welcome feedback from authors and readers.

Notes

¹

For an example checklist, see

[https://www.elsevier.com/_data/promis_misc/CORTEX_TOP_Example_Checklist.pdf]. Further details are available in the *Cortex* TOP guidelines policy [https://www.elsevier.com/_data/promis_misc/Cortex-TOP-author-guidelines.pdf] and FAQs [https://www.elsevier.com/_data/promis_misc/Cortex_TOP_FAQs.pdf].

Authors of Registered Reports are asked to complete a shortened, modified checklist at initial submission of Stage 1 and Stage 2 manuscripts, as most TOP requirements are already in place.

²

For further information on the criteria for awarding badges, authors are referred to:

<https://osf.io/tvyxz/wiki/1.%20View%20the%20Badges/>.

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